3 May 1977

MEMORANDUM FOR THE RECORD

SUBJECT:. Field Station Planning and Accommodation [ ]   25X1

1. Obviously the Agency's operating agreements and
relationship with [   ] a key element to consider when   25X1
planning for the AXANET system of the future. This memorandum
explores some of the alternative methods for jointly meeting
[   ] Agency future communication needs. It is apparent   25X1
that additional analysis is required before a decision is
made to change course but it may well be an appropriate time
to open a dialogue within OC and with [   ] It would now   25X1
be opportune to form an [   ] working level planning group   25X1
to explore system alternatives.

2. Four approaches to field station systems are analyzed
in the Attachment A. Each approach is technically viable.
The field concentrator would require the most changes to our
present system but might well offer the most long term benefits.
The black MUX system provides [   ] privacy but at an   25X1
appreciable cost in cryptographic equipment, space, air
conditioning and other renovations, ATS expansion, etc. This
approach assumes that [   ] requires privacy universally but   25X1
[   ] original requirement was for a private channel wherever   25X1
the [   ] traveled. Some compromise might be   25X1
possible within these bounds. AFT will have limited utility
as an Agency only system. Due to cost, the system will only
be installed at larger field stations. If [   ] and the Agency   25X1
shared AFT and the associated costs, it would then be cost
effective to use the system at more locations.

3. The proliferation of field station systems and equip-
ments should be reviewed for several reasons. First, field
station space is finite and we will soon reach a point where
additional equipment cannot be efficiently and economically
added to a CCC. A worse case would entail [   ] adding an   25X1
AK-4 rack for KW-7 installations and a TERP system. TERP may
allow the removal of [   ] HW-28 units if the off-line   25X1
cryptographic feature is incorporated. On [   ]   25X1
the CCC we can visualize the addition of a SKYLINK terminal,
the retention of the PRS HF system, the addition of SKYMUX
rack, an AFT system or an OCR/PTP, retention of at least one   25X1
M-28 for paper tape requirements, retention of HW-28 equipment

25X1

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for off-line purposes, the addition of a field station
unattended operations (FSUO) rack or safe and retention
of KW-7 and KG-13 cryptographic equipment.   It is also
possible that selected field stations will have to accomo-
date data terminals and NOC hardware in the future.   Secondly,
many of the proposed systems overlap in regard to operating
features.   Attachment two illustrates this situation in
relation to a single case, cast processing.   It will be noted
that in this case increasing real or apparent channel or
printing speed provides diminishing returns since the human
capacity to log and process messages eventually becomes the
barrier to greater throughput.   Greatly increased throughput
can ultimately only be achieved by changing our system of
message handling and accountability.
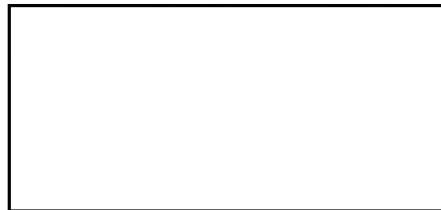
25X1

Attachment:
    As stated

25X1   JAH:jek [   ]

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Field System Approaches to Accommodate [ ]   25X1

	Switch Impact	Field System Impact	Transmission System Impact	HF Backup Impact	Disadvantages	Benefits
AFT Port	None	AFT expanded for additional port, to handle ACP-127 format, for software CSR protection. [ ] costs reduced from TERP to M-40 or M-28.	None required but data rate increase desirable.	75 bps HF sufficient. No service discontinued.	Complex field system. High level of field maintenance and software support. No error control.	Single system. Operator efficiency gain. Backup simplified. Efficient use of channel capacity. Could use AVD to clear backlogs.
Red MUX	Conversion to KG-13.* Red MUX to [ ] ATS port expansion.	[ ] requires TERP or other terminal device. Conversion to KG-13.*	Data rate increase to 300/600 bps.	Fall back to single 75 bps channel. Service withdrawn for separate channel operations.	Inefficient use of channel capacity. May have to mix red and black circuits. Service reduced during HF.	Agency workload reduced. [ ] crypto not required. Only one type crypto system required. Easily accommodate add. requirements.
Black MUX	Black MUX to [ ] ATS port expansion and extensive KW-7 installation at [ ].	[ ] requires KW-7 and terminal equipment. Possible modifications to power, air cond. and [ ]	Data rate increase to 300/600 bps.	Fall back to single 75 bps channel. Service withdrawn for separate channel operations.	Each circuit requires separate crypto. Service reduced during HF backup. Inefficient use of channel capacity.	[ ] gains privacy. Agency workload reduced.
Field Concentrator	New MAX III switch or front end. Conversion to block protocol. Conversion to KG-13.*	New field device allows multiple I/O and dynamic sharing of channel capacity. Conversion to KG-13.* [ ] requires terminal equipment.	Data rate increase to 300/600 bps.	Fall back to single 75 bps channel. No service discontinued.	New system. MAX III modifications or front-end. Pos. requirement for ATS front-end.	Centralized msg. accounting possible. Efficient use of channel capacity. Error correction. Flexible. Handles data requirement. Backup simplified. Can use AVD to clear backlogs.

25X1 (margin markers appear at left for AFT Port, Red MUX, Black MUX, Field Concentrator rows)

* The KG-13 could be replaced with a KG-84.

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Attachment B

Throughput Analysis of Various Systems

	Circuit Running or Print Time	Logging*	Throughput
Present operations at 75 bps.	180 mins.	46 mins.	180 mins.
Present operations at 150 bps (overload used)	90 mins.	46 mins.	90 mins.
25X1 [____] operates own circuit, e.g. SKYMUX. One 75 bps for Agency.	108 mins.	34 mins.	108 mins.
25X1 [____] operates own circuit, e.g. SKYMUX. 150 bps (overload used) for Agency.	54 mins.	34 mins.	54 mins.
Increase channel speed to 300 bps as proposed by FAB.	60 mins.	46 mins.	60 mins.
25X1 Per above but [____] operates separate circuit.	36 mins.	34 mins.	36 mins.
FSUO**	9 mins.	46 mins.	46 mins.
25X1 FSUO. [____] operates separate circuit.	6 mins.	34 mins.	34 mins.
AFT at 75 bps.	180 mins.	0	180 mins.
AFT at 300 bps.	60 mins.	0	60 mins.
25X1 AFT at 300 bps. [____] operates separate circuit.	36 mins.	0	36 mins.
AFT/FSUO combination. or AFT with AVD cast dump.	9 mins.	0	9 mins.

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* The logging figure does not include message tear and collation processes. The true human throughput boundary may be higher than indicated. Assumptions: three hour cast.

25X1
    70 messages at 250 words each.
    40% of traffic [____]
    49 seconds required for logging [____]   25X1
    26 seconds required for logging [____]

** Figures are distorted since system must operate at 75 bps to
25X1   produce a paper tape for [____]